



Voluntary California Quality LED Lamp Specification 3.0

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Voluntary California Quality LED Lamp Specification 3.0

Our webinar will begin at the top of the hour.

This slide deck will be posted on
our webpage after the presentation at
www.energy.ca.gov/appliances/forms/index.html#webdocs.



Resources

Title 20 Compliance Assistance Hotline

Toll free inside California (888) 838-1467

From outside of California (916) 651-7100

appliances@energy.ca.gov

Title 20 Compliance Assistance listserv

<http://www.energy.ca.gov/efficiency/listservers.html>

Webinar documents

<http://www.energy.ca.gov/appliances/forms/index.html#webdocs>



Presentation Topics

I. Background & Context

II. Specification Scope

III. Specification Elements

I. Testing

II. Performance

III. Controls

IV. Marking and packaging

IV. Certification



Background

Voluntary California Quality LED Lamp Specification represents the Energy Commission's recommendation for minimum requirements for an LED light to be considered "California quality"

- LED lamps can achieve similar performance to incandescent lamps with less power
- Mandatory Title 20 standards for state-regulated LED lamps take effect January 1, 2018
- Title 20 standards include both efficacy and minimum performance requirements



Background (cont.)

Version 3.0 aligns with the Title 20 standards for state-regulated LED lamps

Version 3.0 of the Specification encourages early adoption

Certification to the Commission is not required but it is encouraged because the database is used by utility rebate programs



Timeframe of the Specification

Tier 1: January 1, 2017 – December 31, 2017

Tier 2: January 1, 2018 – June 30, 2019



Scope

Applies to LED lamps that meet four criteria:

- (1) Lamp base
- (2) Brightness
- (3) Correlated color temperature (CCT)
- (4) Chromaticity



Scope

(1) Lamp base criterion

The lamp bases covered under the specification must have an American National Standards Institute (ANSI) standard E12, E17, E26, or GU24 base.





Scope

(2) Brightness criterion

The lamp must be capable of producing a quantity of light suitable for general illumination, meaning brightness less than or equal to 2,600 lumens, **and:**

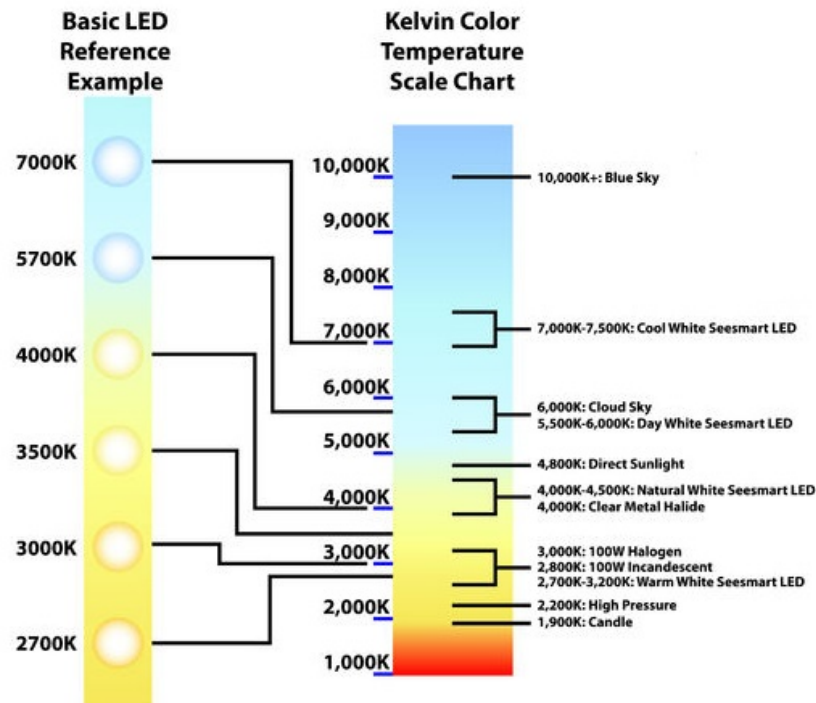
- For candelabra bases, brightness greater than or equal to 150 lumens
- For other bases, brightness greater than or equal to 200 lumens



Scope

(3) Correlated color temperature

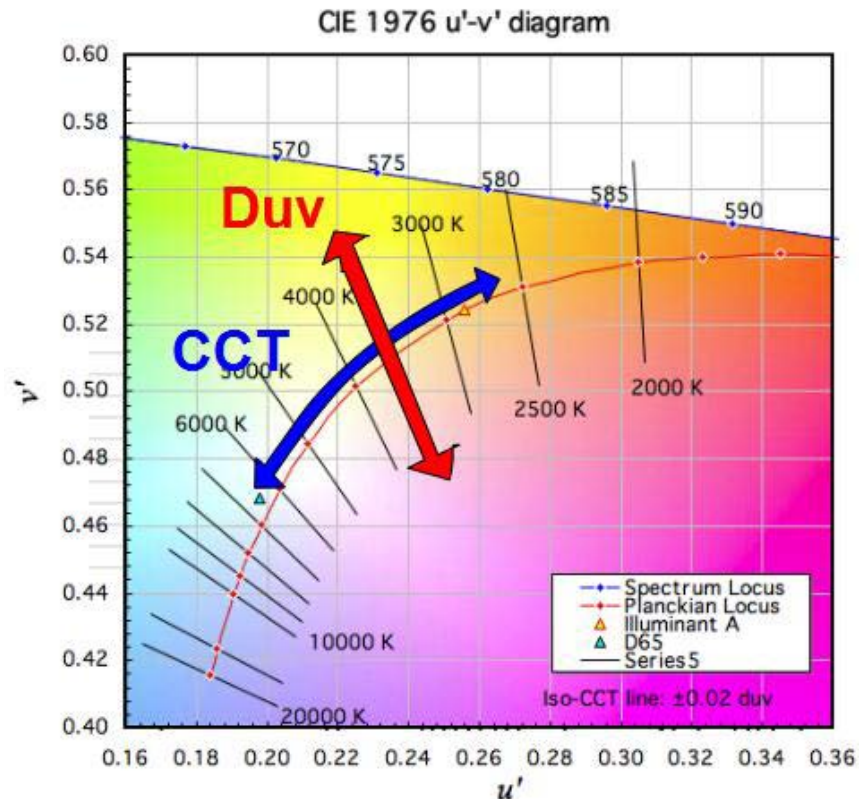
The lamp must be capable of producing white light criterion with a correlated color temperature between 2,200 K and 7,000 K.



Scope

(4) Chromaticity criteria

The lamp must have a $Duv \pm 0.012$, indicative of white light.





Scope

Examples of lamps in the scope





Scope

Examples of lamps not in the scope





Elements of the Voluntary California Quality LED Lamp Specification



Effective Dates

Effective Date	Minimum Efficacy <i>Lumens Per Watt</i>	Minimum Compliance Score: Efficacy +2.3 x CRI	Maximum Standby Power (Watts)	Voluntary Spec Version 3.0
Before 1/1/2018	68	282	-	Tier 1
On and after 1/1/2018	80	297	0.2	Tier 2



Test Procedures

10 C.F.R 430.23(ee) and Appendix BB to Subpart B of Part 430

- Input power
- Lumen output
- Lumens per watt
- Correlated color temperature
- Duv
- Color rendering index (including R1 – R8)
- Power factor
- Lumen maintenance
- Time to failure
- Lamp standby power



Test Procedures

Measurement	Test Procedure	Required or Optional
Flicker	Title 24, part 6, Joint Appendix 10 (2016), tested at both 100% and 20% output. Lamps with a percent amplitude modulation (percent flicker) less than 30 percent at frequencies less than 200Hz shall report “yes” for “reduced flicker operation” described in section 1606, otherwise report “no.”	Optional
Lumen Maintenance, Rated Life, and Survival Rate for Compliance with Title 24 Joint Appendix 8 and minimum dimming level	Title 24, part 6, Joint Appendix 8 (2016).	Optional
Audible Noise	ENERGY STAR® Recommended Practice – Noise (2013) with the following modification: measurements shall be taken at 100 percent output as well as at 20 percent output if dimmable.	Optional



Test Procedures

Manufacturers **may report estimated values** for the minimum rated life based on the tests for lumen maintenance and time to failure **for purposes of Tier 1** of this specification until testing is complete.

Manufacturers must complete the rated life testing and update MAEDBS with those values using the new federal test procedure once testing is completed, and no later than the effective date of the Title 20 appliance efficiency regulations for state-regulated LED lamps.



Photometric Performance Requirements.

Minimum luminous efficacy

Before January 1, 2018 = **68 lumens per watt** (Tier 1)

On/after January 1, 2018 = **80 lumens per watt** (Tier 2)



Photometric Performance Requirements

Minimum combined efficacy score

	Minimum Compliance Score Efficacy +2.3 x CRI
Tier 1	282
Tier 2	297



Photometric Performance Requirements

Color rendering

Minimum average CRI (Ra) is **82**

Minimum individual color score for R1 through R8 is **72**



Photometric Performance Requirements

Minimum light distribution

- ANSI standard lamp shape of **B, BA, C, CA, F, or G: decorative light distribution** requirements of ENERGY STAR's Product Specification for Lamps **Version 1.1** (August 2014) apply
- **A-shape lamps: omnidirectional light distribution** requirements of ENERGY STAR's Product Specification for Lamps **Version 2.0** (December 2015) apply



Photometric Performance Requirements

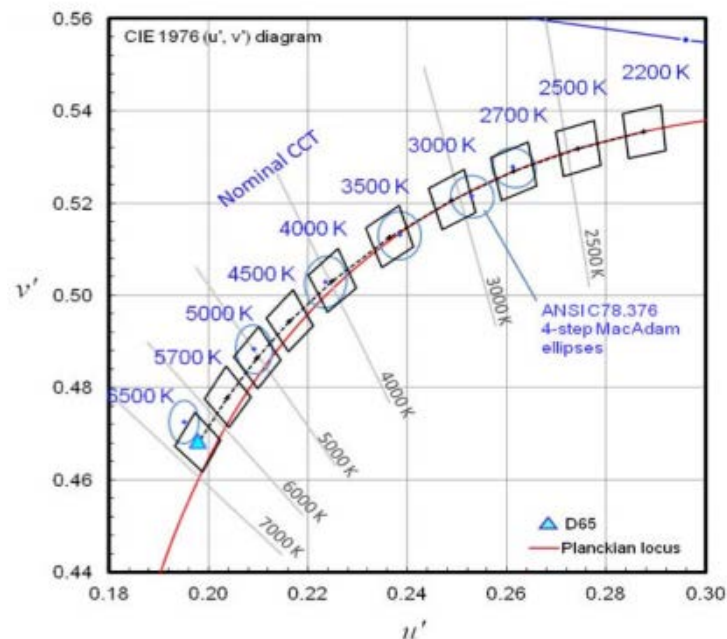
ANSI	BULB SHAPES	APPLICATION
A	Arbitrary (standard)	Universal use for home lighting
B	Bullet or Blunt Tip	Decorative
BA	Bulged with angular tip	Decorative
C	Cone shape	Used mostly for small appliances and indicator lamps
CA	Candle	Chandeliers and Decorative
F	Flame	Decorative interior lighting
G	Globe	Ornamental lighting and some floodlights



Photometric Performance Requirements

Correlated color temperature (CCT)

The chromaticity and color consistency requirements are in Table 1 of Annex B of ANSI C78.377-2015, approximately equivalent to a 4-step MacAdam ellipse.



Source: ENERGY STAR March 2016 Webinar



Rated Lifetime Requirements

Minimum rated life is 10,000 hours



Electrical Performance Requirements

- Minimum power factor is 0.7
- Maximum standby power for **connected** lamps is 0.2 watts on and after January 1, 2018



Controls Requirements

Lamps are not required to be dimmable, however lamps that claim to be dimmable shall:

- Dim down to 10 percent output.
- Have reduced flicker operation.*
- Not produce noise in excess of 24 A-weighted decibels at 100 percent and 20 percent outputs.

*The lamp has less than 30 percent amplitude modulation at frequencies less than 200Hz at 100% and 20% light output for dimmable lamps.



Labeling and Packaging Requirements

Dimmable

- If labeled dimmable, the product must meet the control requirements for dimmable lamps
- If the product does not use a standard phase-cut dimmer, but uses another type of dimmer, dimmability can be qualified with the phrase “dimmable with LED dimmer”; instructions describing the type of dimmers that are compatible or recommended for use with the lamp shall be included



Labeling and Packaging Requirements

Comparison to incandescent performance

If the manufacturer makes any claims of being equivalent in performance to an incandescent, the lamp shall:

- Have a CCT of 3000K or less.
- Have a lumen output of 310 lumens or greater for E26-base.
- Have a lumen output of 150 lumens or greater for E12 and E17 bases.
- Meet the controls requirements for dimmable lamps.



Labeling and Packaging Requirements

Equivalent incandescent wattage

If the manufacturer makes wattage equivalency claims for **medium screw-base** and **GU-24 base omnidirectional** lamps, the lamps shall have a minimum lumen output as follows.

Claimed Equivalent Wattage	Minimum Lumen Output
40 W	310
60 W	750
75 W	1050
100 W	1490
150 W	2500



How to Certify to MAEDBS



Provisional certification

- **Rated Lifetime Test Completed (T/F) [RatedLifetimeTestCompleted]:**

E: Enter the appropriate code representing whether or not the rated lifetime test has been completed. Other entries not shown in the table below will result as an unsuccessful entry.

M: Select the appropriate option from the dropdown menu using the options in the table below.

Code	Action	Rated Lifetime Test Completed
T	True	The required test procedure, 10 C.F.R. section 430.23(ee) and Appendix BB to Subpart B of Part 430, has been completed. Note: <i>This selection requires the completed test value of the rated lifetime to be reported in the next field.</i>
F	False	The required test procedure, 10 C.F.R. section 430.23(ee) and Appendix BB to Subpart B of Part 430, is in progress, with an estimated value provided during disclosure. Note: <i>This selection requires an estimated value of the rated lifetime and must be updated upon completion of the required test procedure prior to the effective date of the mandatory CA Title 20 Tier 1 standard (1/1/2018). Otherwise, the model being certified will be archived regardless of what tier it meets.</i>



Provisional certification

- **Regulatory Status [RegulatoryStatus]:**

E: Enter the appropriate code representing the regulatory status. Other entries not shown in the table below will result as an unsuccessful entry.

M: Select the appropriate regulatory status from the dropdown menu from the options in the table below.

Code	Regulatory Status
V	Voluntarily Certified Note: <i>This code, for this appliance type only, is synonymous with meeting the Voluntary California Quality LED Lamp Specification, Version 3.0</i>
N	Non-Federally Regulated Note: <i>This code is not a valid choice until the first mandatory CA Title 20 tier takes effect on 1/1/2018. Prior to 1/1/2018, only the code "V" can be selected.</i>

Save the excel file as .xlsx format in a location where you will be able to find it when it is time to upload the data file.



Provisional certification

- **Tier [Tier]:**

This field is not part of the Excel certification template and should be left blank if the Manual Entry method is being used.

The Tier field will be calculated by MAEDBS to indicate which tier was met using preceding data values such as Efficacy, Compliance Score, and Standby Power. Using a combination of this calculated result and the letters “V” or “N” in the following Regulatory Status field, a model can be determined to comply with a certain tier of either the CA Voluntary Specification or a mandatory CA Title 20 standard.



California Utility Residential Lighting Incentive Program Overview

Qualifying products must meet:

California Voluntary Quality LED Lamp Specification.

Qualifying products must be listed on MAEDBS



California Investor Owned Utility Residential Lighting Incentive Program Transition Details

- Participants have until March 15, 2017, to comply with Version 3.0 (released January 2017).
 - Utilities will allow sales or shipments of products that were eligible at the end of 2016 with Version 2.0 until March 15, 2017
- After March 15, 2017, all LED products must comply with Version 3.0



California Utility Residential Lighting Incentive Program Leads

Detailed participation instructions are available at:

Utility	Contact Name	Email	Phone
Pacific Gas and Electric Company (PG&E)	Gayle Revels	Gayle.Revels@pge.com	415-973-4086
Southern California Edison (SCE)	Richard Greenburg	Richard.Greenburg@sce.com	626-302-0728
San Diego Gas & Electric (SDG&E)	Jeff Cox	JCox2@semprautilities.com	585-650-6125



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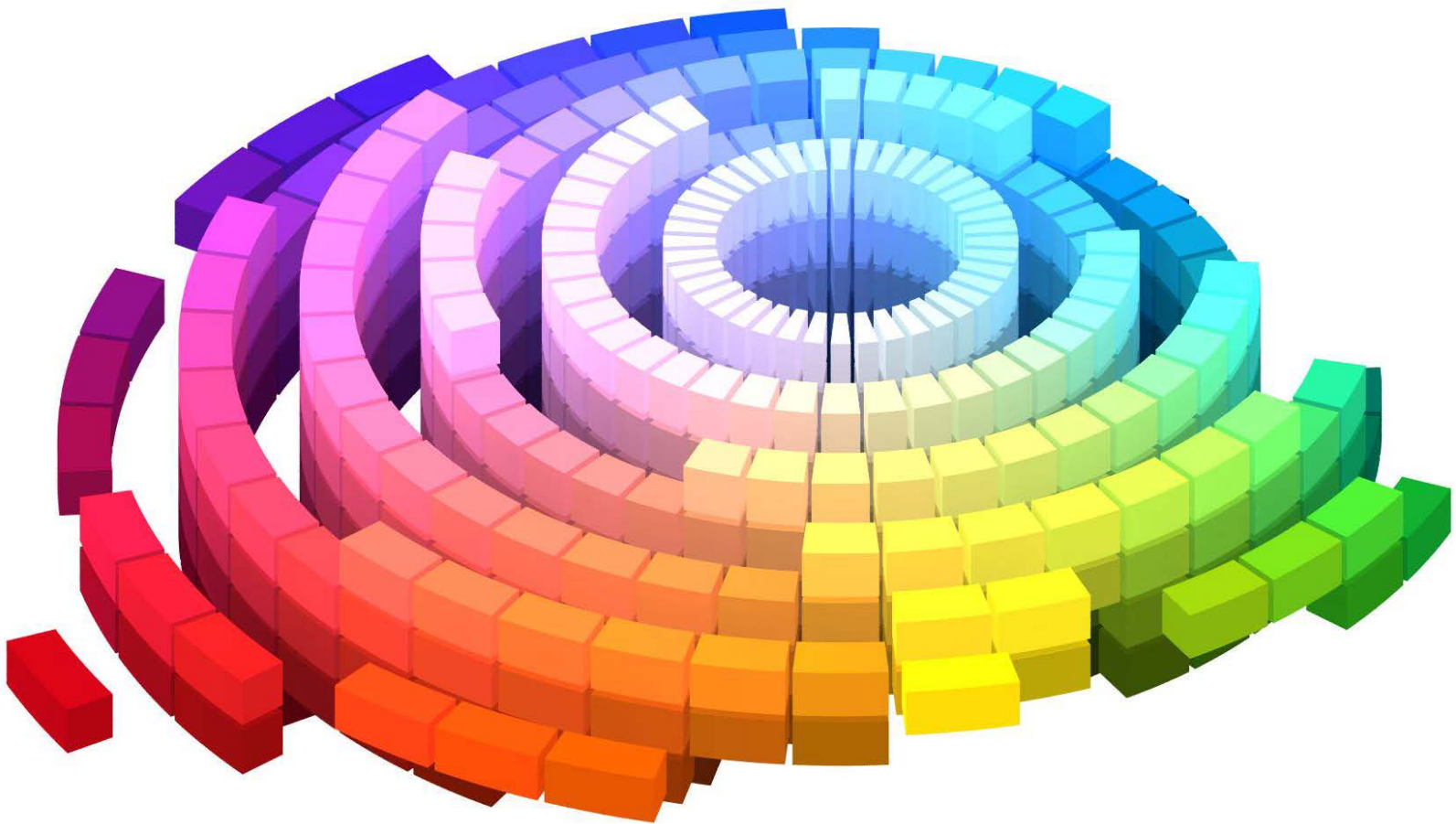
<http://www.energy.ca.gov/efficiency/listservers.html>

Webinar documents

<http://www.energy.ca.gov/appliances/forms/index.html#webdocs>



Questions & Answers





Timeline for LED lamp programs

	Tier 1	Tier 2
A. Voluntary CA Quality LED Lamp Specification Version 3.0	January 1, 2017	January 1, 2018
B. Title 20 Standard for State-regulated LED Lamps	January 1, 2018	July 1, 2019